

### AMENDMENTS TO THE CLAIMS

1. (Currently amended) A process for treatment of water containing dissolved solids, said process being usable for each of the following types of water:

Type 1 water comprising total dissolved solids of 1 to 60 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of <2 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of >1,

Type 2 water comprising total dissolved solids of 1 to 15 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of ≥2 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of >1,

Type 3 water comprising total dissolved solids of 1 to 15 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of >2 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of <1,

Type 4 water comprising total dissolved solids of > 15 and ≤60 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of >5 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of >7,

Type 5 water comprising total dissolved solids of > 15 and ≤60 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of >5 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of <7,

Type 6 water comprising total dissolved solids of >60 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of >5 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of >9, and

Type 7 water comprising total dissolved solids of >60 g/L, a Cl<sup>-</sup>/HCO<sub>3</sub><sup>-</sup> ratio of >5 and a Cl<sup>-</sup>/2SO<sub>4</sub><sup>2-</sup> ratio of <9,

said process comprising the steps of:

(a) contacting the said water with a first reagent comprising a source of calcium ions selected from the group consisting of calcium oxide, calcium hydroxide, and a combination thereof as a sole agent to cause at least some solids dissolved in the water to react with the first reagent and to form a first solid product and a partially processed water, wherein, if the water containing dissolved solids is a Type 1 water[[,]] and the first solid product is precipitated calcium carbonate (PCC) and, if or the water containing dissolved solids is a water of any of Types 2 to 7[[,]] and the first solid product is gypsum-magnesium hydroxide mixture (GMH) and wherein the said GMH is further treated by the addition of sulphuric acid to react with 5-50% of the stoichiometric amount of magnesium hydroxide present in the GMH;

(b) recovering the first solid product from the partially processed water;

(c) at least partially concentrating the partially processed water or a portion thereof, so as to promote the formation of a precipitate and a mother liquor; and

(d) recovering the precipitate from the mother liquor as a second product, wherein the water is a water of type 1 and the second product is sodium hydroxide, sodium sulphate, sodium chloride or sodium carbonate; wherein the water is a water of any one of types 2, 4, 5, 6 and 7, and the second product is sodium chloride; or wherein the water is a water of type 3, and the second product is sodium sulphate.

2. (Currently amended) The process as claimed in claim 1, wherein the water is a type 1 water having a salinity of from 1 to 50-60 g/L total dissolved solids (TDS).

3. (Canceled)

4. (Canceled)

5. (Previously presented) The process as claimed in claim 1, wherein the water is contacted with a pre-determined amount of the first reagent.

6. (Previously presented) The process as claimed in claim 1, wherein the water is a water of type 1 and the first product is precipitated calcium carbonate (PCC).

7. (Previously presented) The process as claimed in claim 1, wherein the water is a water of type 1 and the second product is sodium hydroxide.

8. (Previously presented) The process as claimed in claim 1, wherein the water is a water of any one of types 2, 4, 5, 6 and 7, and the second product is sodium chloride.

9. (Previously presented) The process as claimed in claim 1, wherein the water is a water of type 3, and the second product is sodium sulphate.

10. (Previously presented) The process as claimed in claim 8, wherein, after step (b), the partially processed water is contacted, in a step (e), with a second reagent also comprising a source of calcium ions selected from the group consisting of calcium oxide, calcium hydroxide, and a combination thereof, so as to cause at least some of the solids dissolved in the partially processed water to react with the second reagent and to form magnesium hydroxide, and wherein the magnesium hydroxide is recovered from the partially processed water before the recovery of said sodium chloride therefrom.

11. (**Previously presented**) The process as claimed in claim 1, wherein the water is a water of type 1 and the pH of the partially processed water is reduced, in a step (b)(i), to a pH falling within the range of from 7 to 10.

12. (**Currently amended**) The process as claimed in claim 11, wherein the pH of the partially processed water is reduced by adding to the partially processed water a pH reducing agent selected from the group consisting of hydrochloric acid, sulphuric acid, saline impaired feed water, ~~an a reverse osmosis (RO)~~ concentrate of type 1 water, and a combination of any two or more thereof.

13. (**Previously presented**) The process as claimed in claim 11, wherein the water is a type 1 water, the pH of the partially processed water is reduced to between 8 and 9 by adding sulphuric acid to the partially processed water and wherein the second product is sodium sulphate.

14. (**Previously presented**) The process as claimed in claim 11, wherein the water is a type 1 water, the pH of the partially processed water is reduced to between 8 and 9 by adding hydrochloric acid to the partially processed water and wherein the second product is sodium chloride.

15. (**Currently amended**) The process as claimed in claim 11, wherein the water is a type 1 water, the pH of the partially processed water is reduced to between 8 and 9 by adding ~~diverted type 1~~ water to the partially processed water and wherein the second product is sodium carbonate.

16. (**Currently amended**) The process as claimed in claim 16, wherein the first reagent is hydrated lime slurry and the weighted average sulphate ion concentration of the water and the hydrated lime slurry is controlled below 3 g/L by controlling the volume of hydrated lime slurry contacted with the water or by controlling the concentration of solids in the hydrated lime slurry, or by both.

17. (**Canceled**)

18. (**Previously presented**) The process as claimed in claim 1, wherein the reacted GMH product is dried at a temperature between 120°C and 300°C.

19. (**Previously presented**) The process as claimed in claim 1, wherein the water to the process is a type 4 or a type 6 water, wherein, after step (b), sodium carbonate is added to the

**Application No.: 10/533,980**  
**Filing Date: March 27, 2006**

partially processed water, and wherein magnesium carbonate light (MCL) is recovered therefrom to produce a treated water which is low in magnesium content.

20. **(Canceled)**

21. **(Previously presented)** The process as claimed in claim 6, wherein, in step (a), only a portion of the bicarbonate ions in the water are converted to PCC and, wherein, in a secondary reaction step, the first solid product and the partially processed water of step (a) are contacted with a solution of calcium chloride to convert substantially all of the carbonate ions in the partially processed water to PCC.

22. **(Previously presented)** The process as claimed in claim 6, wherein, in step (a), only a portion of the bicarbonate ions in the water are converted to PCC and, wherein, in a secondary reaction step after the recovery of the said PCC in step (b), the partially processed water of step (b) is contacted with a solution of calcium chloride to convert substantially all of the remainder of the carbonate ions in the partially processed water to supplementary PCC.

23. **(Canceled)**

24. **(Currently amended)** The process as claimed in claim 1, wherein the water is or comprises a concentrate from ~~an~~ a reverse osmosis (RO) desalination plant.

25. **(Previously presented)** The process as claimed in claim 1, wherein a portion of the mother liquor of step (d) is combined with the partially processed water from step (b) before it is subjected to evaporation in step (c).

26. **(Currently amended)** The process as claimed in claim 1 ~~or claim 25~~, wherein a portion of the mother liquor of step (d) is evaporated to total dryness.

27-36. **(Canceled)**

37. **(New)** The process of Claim 1, wherein the process is carried out on water of Types 1-3 or 5-7.